SPIN MICRO WIND TURBINE

OPERATIONS AND MAINTENANCE MANUAL

Version *1.0*

4/25/2014

VERSION HISTORY

Version #	Implemented By	Revision Date	Approved By	Approval Date	Reason
1.0	*Yates*	*4/25/14*	*Yates*	*4/25/14*	*First Edition*

1. *Preface*

This Manual applies to the SPIN turbine produced by SPINergy Wind Solutions.

It is the responsibility of the turbine owner to only allow knowledgeable and qualified persons to operate the micro-wind turbine.

Do not erect and operate the micro-wind turbine before having studied and understanding the following:

- ✓ Safety Measures for Operations
- ✓ User Manual

2. *Updating of the Manual*

This manual will be continuously updated. Corrections to the document will be noted under the "Version History" section of the document.

3. *Contents*

TABLE OF CONTENTS

1 SAFETY MEASURES FOR OPERATION

Read these safety measures in their entirety prior to assembling the SPIN micro wind turbine. Check boxes to indicate safety measures are fully understood.

- ☐ SAVE THE OPERATIONS MANUAL. This manual contains vital instructions that are to be followed to properly assemble, install, and maintain the wind turbine.
- ☐ Read, understand, and follow all warnings.
- ☐ Do not install the SPIN micro wind turbine on a windy day.
- ☐ Properly torque all fasteners during assembly and installation.
- ☐ Turn off the wind turbine if it emits an unusual noise.

- Properly mark guy wires to make aware of tripping hazard.
- Rotating blades can cause serious injury. Do not put objects of any kind above safety marker on tower.
- Ensure the wind turbine assembly is level before putting into operation.

2 TECHNICAL SPECIFICATIONS

Table 1: Wind Turbine Specifications

Model	SPIN micro wind turbine
Weight	4.5kg
Rotor Diameter	43.7cm
Start Up Wind Speed	10m/s
Watt Hours/month	600
Maximum Wind Speed	17m/s
Rated Power	5W

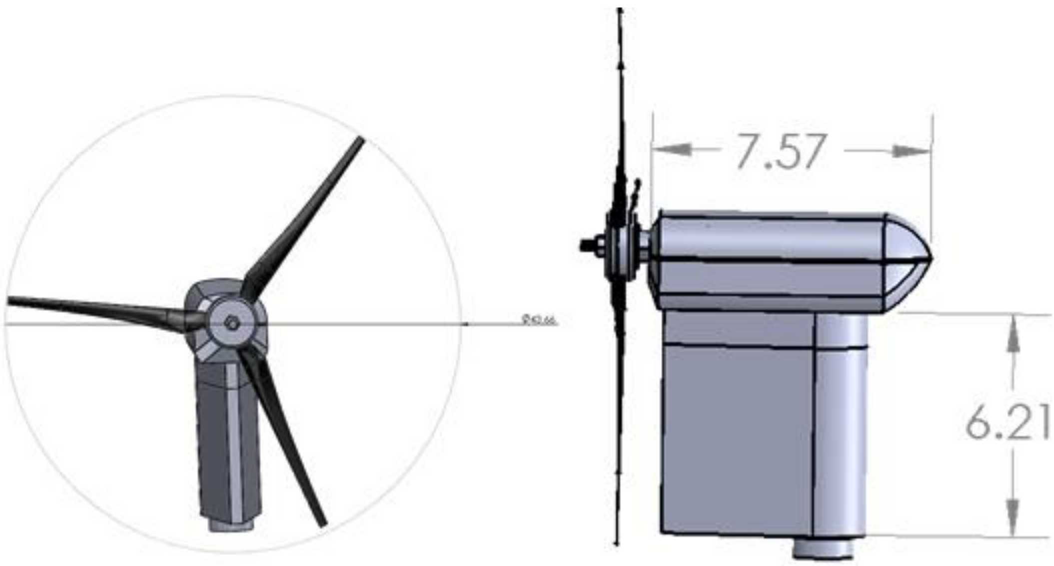


Figure 1: Turbine Component Dimensions

3 PACKAGED WIND TURBINE COMPONENTS

Table 2: Packaged Components

Component	Quantity
Base	1
3-1/2” x 3/4” bolt	1
3/4” locknut	1
6ft tower section	3
3ft tower section	1
Tower coupler	3
Guy wire attachment plate	1
Guy wire	3
Main frame assembly	1
Nacelle fasteners	6
Nacelle	1
Generator	1
Hub	1
Blade	3

4 TURBINE INSTALLATION

4.1 MOUNTING BLADES ONTO HUB

Place the three provided blades into the seats in the hub. Once the blades are in place, put the cover of the hub over the blades and tighten the nut until the blades are secured onto the hub.



Figure 2: Blade and Hub Assembly

4.2 MOUNTING YAWING SYSTEM TO MAIN FRAME

Attach the yawing system to the main frame by fitting the yawing mechanism through the hole in the main frame. Once through the main frame, place the retaining ring into the groove on the yawing mechanism that protrudes just above the main frame. With the retaining ring in place, put a locknut on the three provided bolts and place in holes for yawing system and main frame. Tighten bolts with a wrench.

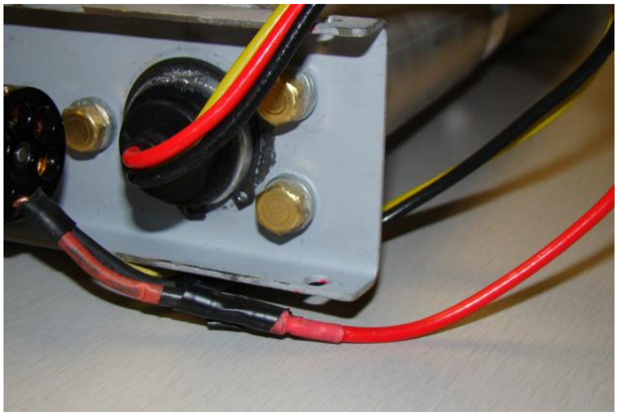


Figure 3: Yawing System and Main Frame Attachment

4.3 MOUNTING HUB TO GENERATOR

In order to mount the blade hub to the generator, the gear box must be attached to the main frame using the supplied M3 bolts with the supplied nuts. Then the couplers for the shaft for the generator must be tightened with a hex key. Lastly, the couple for the shaft to the blade hub must be mated together by using the previously used hex key. After the generator and hub are in place, connect the red, yellow, and black wires for the generator and slip ring.



Figure 4: Hub, Gearbox, and Generator Assembly

4.4 ANCHORING OF BASE TO GROUND

With a suitable location for the turbine found, it is essential to level the ground for the base to settle into. Use a level to ensure the base is level and if necessary modify the ground with a shovel or any necessary tool to make the ground level. Once the ground is level, place the base in its operating location and anchor the base to the ground with the provided anchors. IMPORTANT: Ensure the anchors are properly in place or the base is liable to tip over during the raising operation.

4.5 NACELLE ONTO MAIN FRAME

In order to attach the nacelle onto the main frame, slide the lower part of the nacelle/faired tower section over the sleeve of the yawing system. Then place the upper half of the nacelle onto the bottom half of the nacelle, then tighten with the supplied M3 fasteners.



Figure 5: Main Frame and Nacelle Assembly

4.6 CONNECTION OF TOWER SECTIONS

Stage the tower sections starting with the single 3ft section followed by the three 6ft sections. Place couplers in between each section. Starting with the 3ft section, place the guy wire attachment plate on top of the tower section and then slide the wire from the yawing system through the tower section and screw the first coupler onto the 3ft tower section. Then run the wire through the 6ft tower section and screw that tower section into the coupler attached to the 3ft tower section. Repeat the process for the next two tower sections.

4.7 CONNECT TOWER TO BASE AND RAISE

Before attaching the tower to the base, place the selected anchors for the guy wires into the ground and ensure that the anchors are secure. Once they are secure, place three of the four guy wires onto the anchors and ensure there are no obstructions from the guy wire anchors

to the guy wire attachment plate. Then connect the tower to the base using the supplied ¾" bolt and locknut. With the tower attached to the base, connect the last remaining guy wire to the last anchor using the quick disconnect that was supplied with the guy wire.



Figure 6: Raising of the Tower

4.8 WIND TURBINE IS ASSEMBLED AND READY FOR USE



Figure 7: Assembled Wind Turbine

5 OPERATIONS OF TURBINE

Once wind turbine is assembled, be sure that brake is disengaged and enables the blades to turn at safe speeds. Under normal, windy conditions, plug small electronics into plug located on the base to allow the electronics to be charged.

6 MAINTENANCE OF TURBINE

6.1 MONTHLY

- ✓ Inspect base to ensure no rust has accumulated.
- ✓ Check tightness of bolts.
- ✓ Check tension in guy wires.

6.2 QUARTERLY

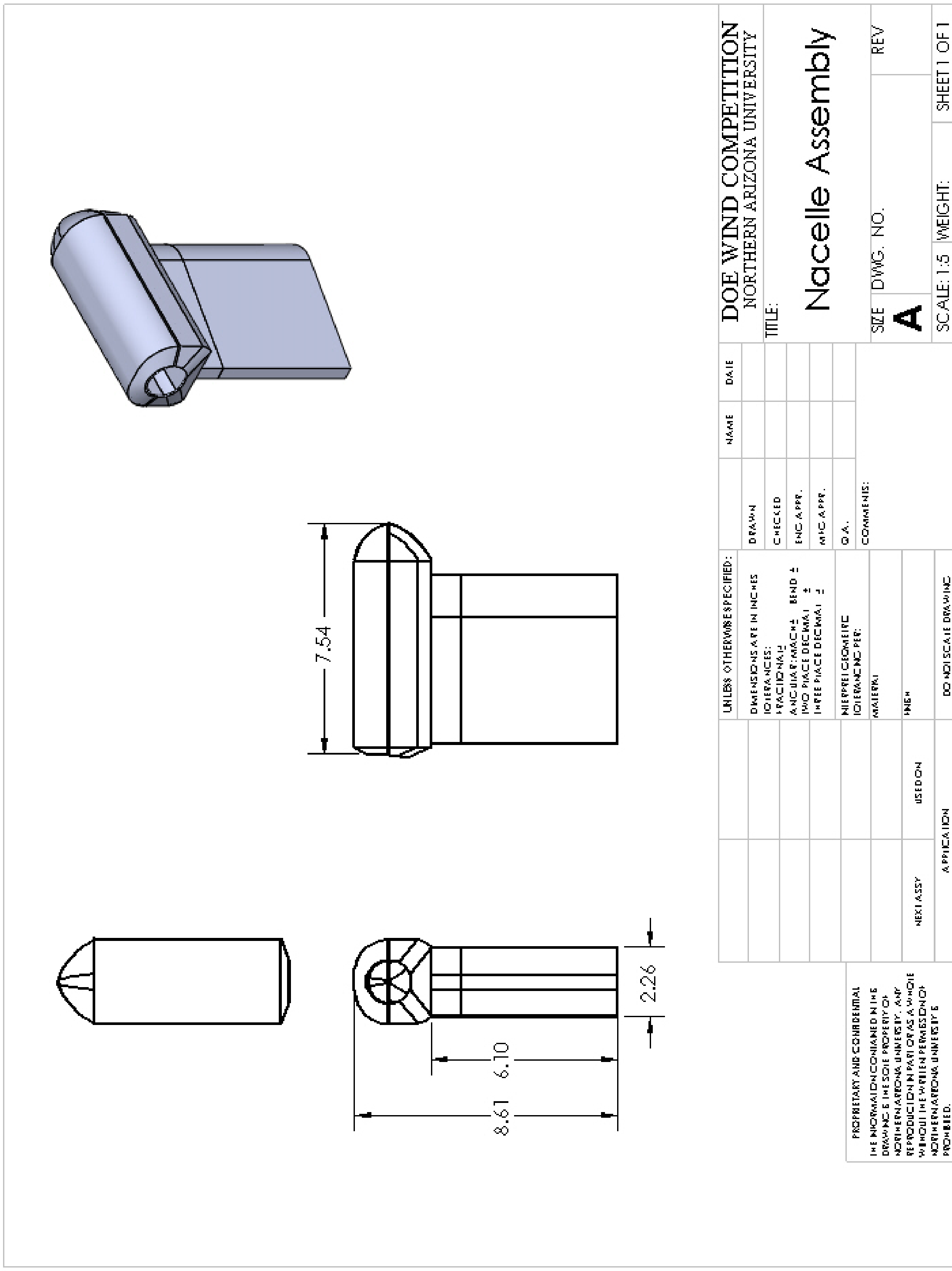
- ✓ Inspect condition of blades.
- ✓ Ensure battery is functional.
- ✓ Inspect wiring connections.
- ✓ Inspect tower couplers.
- ✓ Inspect generator conditions.
- ✓ Inspect condition of nacelle

APPENDIX A: REPLACEMENT COMPONENTS

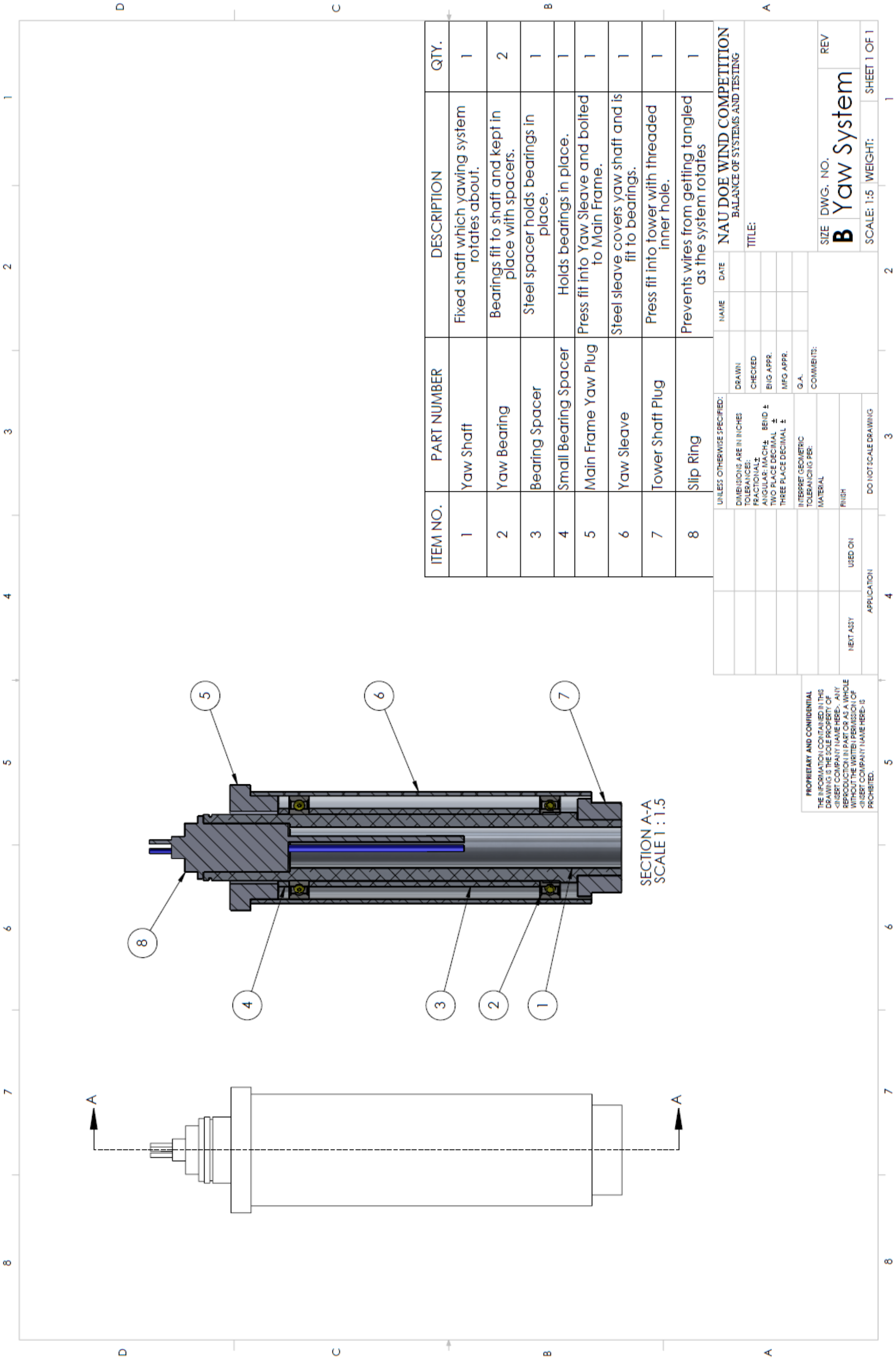
Part	Part Number
Junction Box	RSC080804RC
Guy Wires	3498T41
6ft Tower	5038K5
3ft Tower	5038K38
Coupler	44705K99
Battery	UB12120 (D5775)

APPENDIX B: ENGINEERING DRAWINGS

NACELLE ASSEMBLY DRAWING

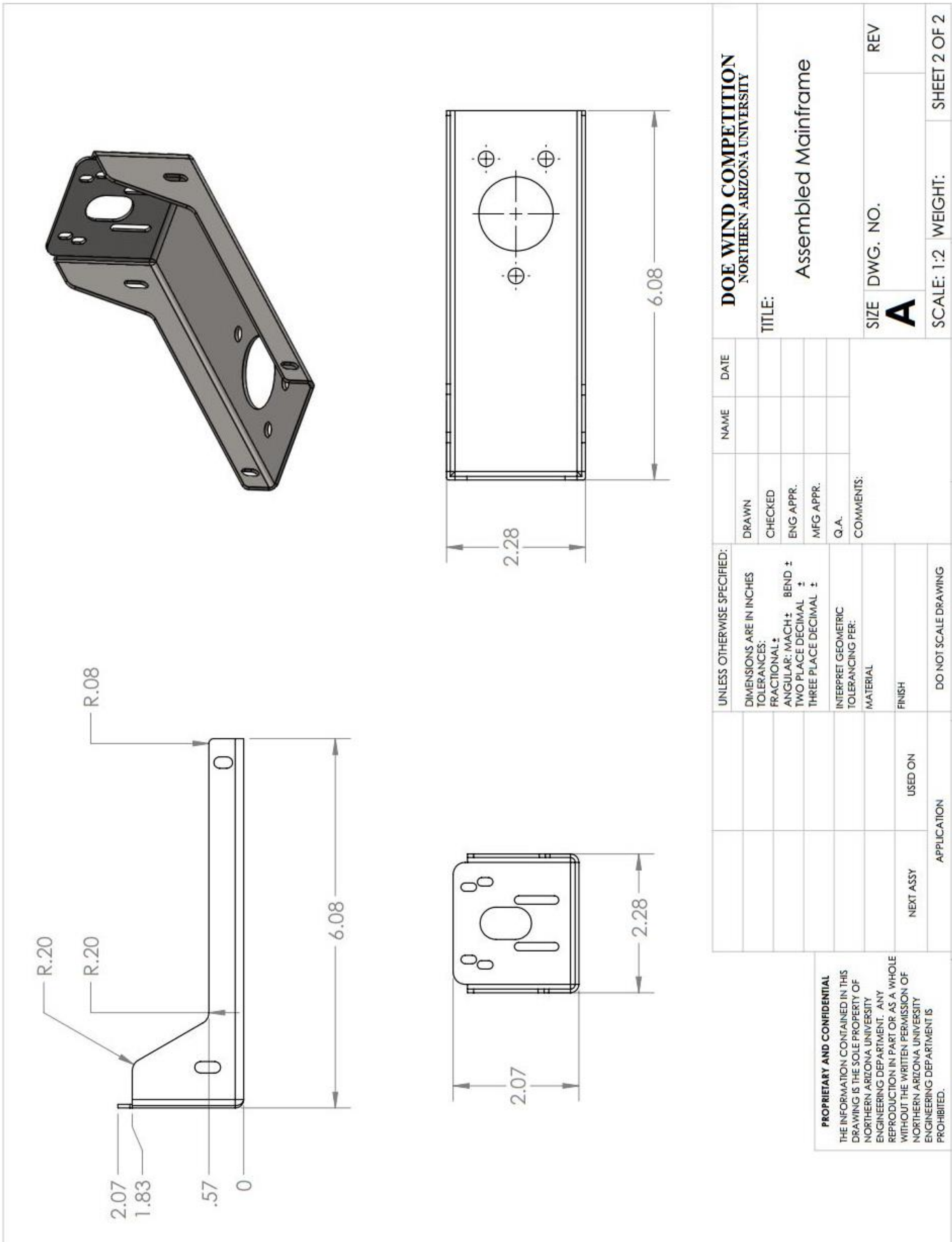


YAWING SYSTEM SECTIONAL VIEW DRAWING

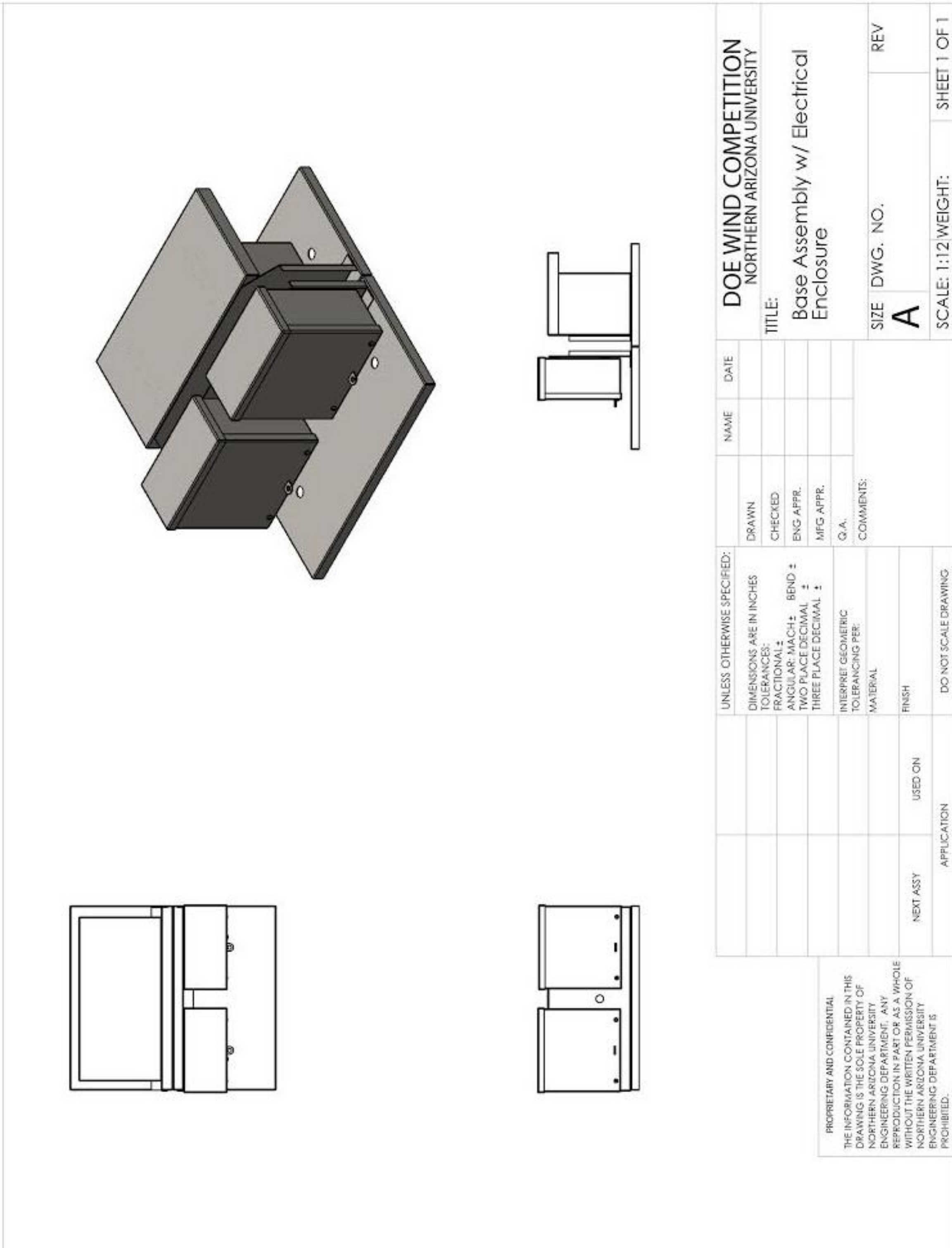


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	Yaw Shaft	Fixed shaft which yawing system rotates about.	1
2	Yaw Bearing	Bearings fit to shaft and kept in place with spacers.	2
3	Bearing Spacer	Steel spacer holds bearings in place.	1
4	Small Bearing Spacer	Holds bearings in place.	1
5	Main Frame Yaw Plug	Press fit into Yaw Sleave and bolted to Main Frame.	1
6	Yaw Sleave	Steel sleave covers yaw shaft and is fit to bearings.	1
7	Tower Shaft Plug	Press fit into tower with threaded inner hole.	1
8	Slip Ring	Prevents wires from getting tangled as the system rotates	1

MAINFRAME DRAWING



BASE DRAWING



GUY WIRE SLIP ON RING ATTACHMENT DRAWING

